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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,074	01/23/2002	Piero Colombani	CENTRO-110	7342
530	7590	03/01/2005	EXAMINER	
LERNER, DAVID, LITTENBERG, KRUMHOLZ & MENTLIK 600 SOUTH AVENUE WEST WESTFIELD, NJ 07090			PATEL, VINIT H	
			ART UNIT	PAPER NUMBER
			1764	

DATE MAILED: 03/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/055,074	COLOMBANI ET AL.	
	Examiner	Art Unit	
	Vinit H. Patel	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 9-11 is/are rejected.
- 7) ☒ Claim(s) 4-8 and 12-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>23 Jan 2002</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Objections

1. Claims 4-8 and 12-14 are objected to under 37 CFR 1.75(c) as being improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly the claims have not been further treated on the merits.

Claims Analysis

2. A claim to a device or apparatus may contain a reference to the process in which it is intended to be used without being objectionable under 35 U.S.C. 112, second paragraph. See MPEP 2114. For examination purposes, the Examiner has interpreted the term "System for the production of hydrogen" to mean an apparatus for the production of hydrogen, as the term "system" as used in claims 10-14 is not a statutory class of invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Poirier et al., Int. J. Hydrogen Energy, Vol. 22, No. 4, pp. 429-433 (1997), in view of Sioui et al., U.S. Patent No. 6,506,510.

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Regarding claim 1, Poirier et al. discloses the process for production of hydrogen comprising natural gas (a hydrocarbon) decomposed via use of a catalyst over a hot catalytic bed according to the reaction: $\text{CH}_4 \leftrightarrow \text{C} + 2\text{H}_2$, and a catalyst regeneration phase that burns off (eliminates) carbon accumulation on the catalyst using air (See pp. 429-430). Poirier et al. does not disclose the use of steam reforming in the regeneration phase.

Sioui et al., discloses that it is possible to use steam or water (rather than using oxygen containing gas) regeneration by the primary reaction: $\text{C} + \text{H}_2\text{O} \leftrightarrow \text{CO} + \text{H}_2$, and that the regeneration gas serves as fuel (re-used as a source of energy) (See C10/L60-67 and C10/L32-34). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Poirier et al., with Sioui et al. for the purpose to provide increased hydrogen production with water or steam as the regenerant (See C11/L3-5).

Regarding claim 2, Sioui et al. discloses that the regeneration effluent gas can be used for combusting a portion of the hydrocarbon fuel to the cracking reactor (used as energy in the process itself) (See C10/L43-48).

Regarding claim 3, Poirier et al. discloses a two-reactor system wherein one reactor is used for hydrogen production and while the other is in regeneration phase (See pg. 430).

Regarding claim 9, Sioui et al. discloses effluent (regeneration) gas may be utilize its heat for maintaining the cracking reactor at regeneration conditions (heating the retort) (C10/L52-59).

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4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Poirier et al., in view Sioui et al. as applied to paragraph 3 above. Sioui et al. further discloses a system (apparatus) for the production of hydrogen from natural gas (hydrocarbon) comprising a cracking reactor 10 (retort) having an inlet to a hydrocarbon 18 and regenerant source 20 (steam supply) (C13/L30-45), housing the reactor in a furnace (hot chamber) to utilize heat (C10/L50-55) and that the regenerant gas may be supplied to a burner of the furnace (hot chamber) (C5/L15-20) and furnace 22 comprises a combustion gas burner inlet (for supply of combustible gas) used for furnace heating (C14/L1-7).


5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Poirier et al., in view Sioui et al. as applied to paragraph 3 above. Poirier et al. further discloses a system (apparatus) for the catalytic production of hydrogen comprising a reactor 1 and 2 (retorts) wherein one reactor is used for hydrogen production while the other reactor is used for regeneration (indicating that the hydrocarbon and steam would be supplied alternatively to each of the reactor) (See page 430-431) and Sioui et al. discloses a system (apparatus) for the production of hydrogen from natural gas (hydrocarbon) comprising a reactor having an inlet to a hydrocarbon 18 and regenerant source 20 (steam supply) (C13/L30-45), housing the reactor in a furnace (hot chamber) to utilize heat (C10/L50-55) and that the regenerant gas may be supplied to a burner of the furnace (hot chamber) (C5/L15-20) and furnace 22 comprises a combustion gas burner inlet (for supply of combustible gas) (C14/L1-7).

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vinit H. Patel whose telephone number is (571) 272-0856. The examiner can normally be reached Monday – Friday from 9:00 am - 5:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached at (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Alexa Doroshenk
Patent Examiner
Art Unit 1764



Vinit H. Patel
February 24, 2005